

इंटरनेट

मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 9175-30 (1987): Rationalized Steels for Automobile and Ancillary Industry, Mechanical and Physical Properties - Part 30 20Ni7CrMo2 Grade steel [MTD 16: Alloy Steels and Forgings]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE



IS : 9175 (Part 30) - 1987

Indian Standard

SPECIFICATION FOR
RATIONALIZED STEELS FOR
THE AUTOMOBILE AND ANCILLARY INDUSTRY

PART 30 MECHANICAL AND PHYSICAL PROPERTIES OF
20Ni7CrMo2 GRADE STEEL

UDC 669.14 (083.8) : 629.113.543

© Copyright 1987

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Indian Standard

**SPECIFICATION FOR
RATIONALIZED STEELS FOR
THE AUTOMOBILE AND ANCILLARY INDUSTRY**

**PART 30 MECHANICAL AND PHYSICAL PROPERTIES OF
20Ni7CrMo2 GRADE STEEL**

Co-ordinating Committee on Materials for Automobiles, SMDC 31

Chairman

SHRI C. V. TIKEKAR

*Representing*Tata Engineering & Locomotive Co Ltd,
Jamshedpur*Members*SHRI A. K. ROY (*Alternate to*
Shri C. V. Tikekar)

SHRI V. P. AGRAWAL

Steel Authority of India Ltd (Rourkela Steel
Plant), RourkelaSHRI A. K. MALHOTRA (*Alternate*)

SHRI R. BHANDARI

All India Automobile and Ancillary Industries
Association, BombaySHRI S. PANIKAR (*Alternate*)

SHRI R. BHATTACHARYYA

Guest Keen Williams Ltd, Howrah
Premier Automobiles Ltd, Bombay

SHRI A. T. BORATE

SHRI J. M. SHAH (*Alternate*)

SHRI R. R. CONTRACTOR

Automobile Product of India Ltd, Bombay

SHRI V. A. RAJAMONEY (*Alternate*)

SHRI S. P. DEY

Hindustan Motors Ltd, Uttarpara

SHRI V. GOPAL

Lucas-TVS Ltd, Madras

SHRI K. S. SUBRAMANIAN (*Alternate*)

SHRI S. C. GUPTA

Tata Iron & Steel Co Ltd, Jamshedpur

DR A. N. MITRA (*Alternate*)

SHRI D. N. GUPTA

Steel Authority of India Ltd (Bokaro Steel
Plant), Bokaro

SHRI H. A. JAISINGHANI

Mahindra and Mahindra Ltd, Bombay

SHRI S. RAMACHANDRAN (*Alternate*)

SHRI R. C. JHA

Steel Authority of India Ltd, Alloy Steel Plant,
DurgapurSHRI R. C. MODI (*Alternate*)

SHRI M. L. KATYAL

Bajaj Auto Limited, Pune

SHRI S. R. SALGIA (*Alternate*)

SHRI S. S. LAKHUNDI

Bharat Forge Co Ltd, Pune

DR M. K. S. CHERUKURN (*Alternate*)(*Continued on page 2*)

© Copyright 1987

BUREAU OF INDIAN STANDARDS

This publication is protected under the *Indian Copyright Act* (XIV of 1957) and reproduction in whole or in part by any means except with written permission of the publisher shall be deemed to be an infringement of copyright under the said Act.

(Continued from page 1)

<i>Members</i>	<i>Representing</i>
SHRI S. C. MAHINDRU	Ministry of Defence, Chief Inspectorate of Heavy Vehicles, Avadi
SHRI P. SOMASUNDRAM (Alternate)	
COL P. M. MENON	Ministry of Defence, Directorate of Standardization (DGI), New Delhi
DR V. PANDURANGA	Tractors and Farm Equipment Ltd, Madras
SHRI T. K. SUBBARAYAN (Alternate)	
DR R. V. PATHY	Mahindra Ugine Steel Co Ltd, Bombay
SHRI R. N. SINGH (Alternate)	
SHRI K. PARTHASARTHY	Ashok Leyland Ltd, Madras
SHRI T. S. SUDARSHAN (Alternate)	
DR P. G. PATANKAR	Central Institute of Road Transport, Pune
SHRI L. SHANTARAM (Alternate)	
SHRI G. R. PRAKASH	Visvesvarya Iron & Steel Ltd, Bhadravati
SHRI B. HARIDASACHAR (Alternate)	
SHRI R. RAGHAVAN	Enfield India Ltd, Tiruvottiyur
SHRI T. M. BALARAMAN (Alternate)	
SHRI C. V. K. MURTHY RAO	Association of Indian Automobile Manufacturers, Bombay
SHRI AJAY KUMAR RAMAN	Escorts Ltd, Faridabad
SHRI S. D. KHANNA (Alternate)	
SHRI S. P. RAO	WG Forge and Allied Industries Ltd, Thane
SHRI B. K. ANANTHARAMIAH (Alternate)	
DR V. RAMASWAMY	Steel Authority of India Ltd (Research & Development Centre for Iron and Steel), Ranchi
SHRI S. R. MEDIRATTA (Alternate)	
SHRI ANANTHA REDDY	Nagarjuna Steels Ltd, Hyderabad
SHRI J. SRINIVAS (Alternate)	
REPRESENTATIVE	Automotive Research Association of India, Pune
SHRI A. S. SAUND	Saund Zweired Union (I) Ltd, Gwalior
SHRI B. S. SAUND (Alternate)	
SHRI K. SHANKARANARAYANAN	Directorate General of Technical Development, New Delhi
SHRI S. K. SHARMA	Ministry of Industrial Development, Small Scale Industry, New Delhi
SHRI T. R. SEHGAL (Alternate)	
SHRI A. R. SONALKAR	Mahindra and Mahindra Ltd (International Tractor Division), Bombay
SHRI A. R. JANIKA (Alternate)	
SHRI L. SRINIVASAMADHAVAN	Standard Motor Products of India Ltd, Madras
SHRI K. RANGANATHAN (Alternate)	
SHRI M. S. GANAPATHY SUBRAMANIAM	Mopeds (India) Ltd, Tirupathi
SHRI A. G. NAMMALVAR (Alternate)	
SHRI S. TIWARI	Directorate General of Ordnance Factories, Calcutta
SHRI G. N. ROY (Alternate)	
SHRI K. RAGHAVENDRAN, Director (Struc & Met)	Director General, BIS (Ex-officio Member)

Secretary

SHRI B. K. MUKHOPADHAYAY
Deputy Director (Metals), BIS

(Continued on page 7)

Indian Standard

SPECIFICATION FOR RATIONALIZED STEELS FOR THE AUTOMOBILE AND ANCILLARY INDUSTRY

PART 30 MECHANICAL AND PHYSICAL PROPERTIES OF 20Ni7CrMo2 GRADE STEEL

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 15th January 1987, after the draft finalized by the Co-ordinating Committee on Materials for Automobiles had been approved by the Structural and Metals Division Council.

0.2 Part 1 of this standard was published in 1979 which covers the chemical composition of 33 rationalized steels. The mechanical properties, hardenability and isothermal transformation characteristics of these 33 rationalized steels are being covered in different parts of this standard (Parts 2 to 34). The data concerning these properties, given in this standard, is only for guidance and information purposes.

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard (Part 30) covers the chemical composition, mechanical properties, hardenability and isothermal transformation characteristics of 20Ni7CrMo2 grade of steel for use by automobile and ancillary industry.

2. CHEMICAL COMPOSITION

2.1 The chemical composition of this grade of steel shall be as given below:

*Rules for rounding off numerical values (revised).

Constituent, Percent

C	Si	Mn	Ni	Cr	Mo	S	P
0.17-0.22	0.20-0.35	0.45-0.65	1.65-2.00	0.40-0.60	0.20-0.30	0.035	0.035
						Max	Max

3. HARDNESS

3.1 The maximum hardness for this grade of steel delivered in annealed condition, when determined in accordance with IS : 1500-1983*, shall be 217 HB.

4. MECHANICAL PROPERTIES

4.1 The mechanical properties of this grade of steel in blank carburized and hardened condition when determined in accordance with IS : 1598-1977† and IS : 1608-1972‡ shall be as given below:

- | | |
|---|-----|
| a) Tensile strength, MPa, <i>Min</i> | 855 |
| b) Elongation, percent, <i>Min</i>
(gauge length $5.65\sqrt{50}$) | 12 |
| c) Izod impact value, joules, <i>Min</i>
at room temperature | 41 |
| d) Limiting ruling section, mm | 30 |

5. HOT WORKING AND HEAT TREATMENT TEMPERATURES

5.1 The recommended hot working and heat temperatures shall be as given below:

Forging/rolling temperature	1 250°C
Process annealing temperature	650°C-700°C
Carburizing temperature	880-920°C
Hardening temperature	780-820°C
Tempering temperature	220°C, <i>Max</i>

6. TRANSFORMATION CHARACTERISTICS

6.1 The isothermal transformation diagram for this grade of steel is given in Fig. 1.

7. HARDENABILITY

7.1 The end quench hardenability band is given in Fig. 2

*Method for Brinell hardness test for metallic materials (*second revision*).

†Method for izod impact test of metals (*first revision*).

‡Method for tensile testing of steel products (*first revision*).

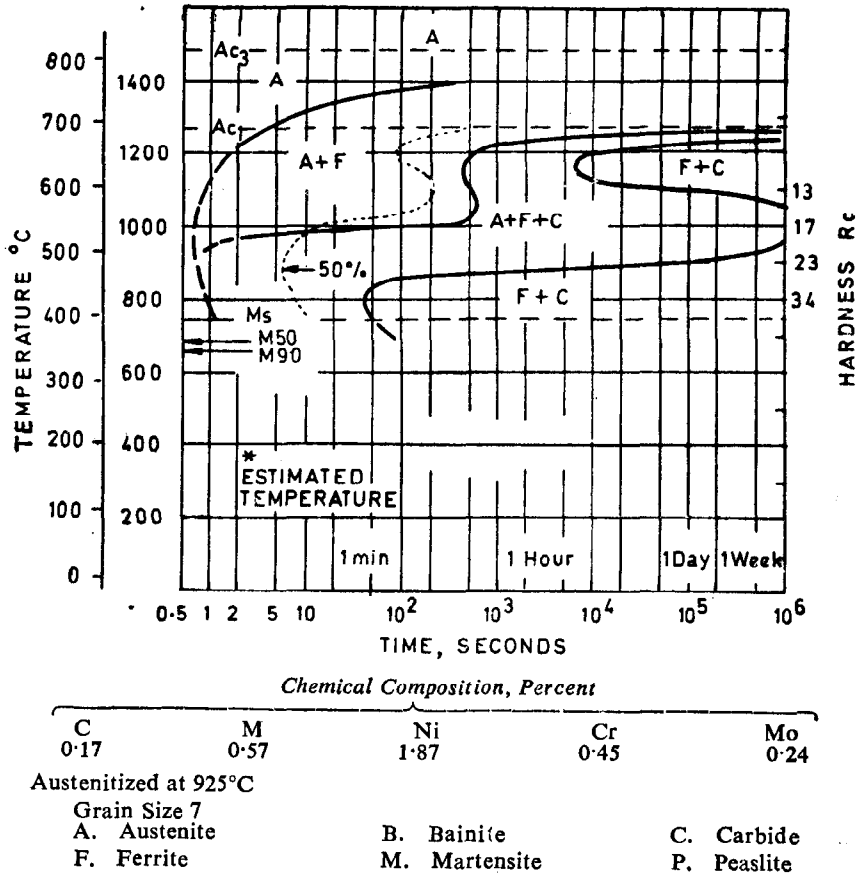


FIG. 1 ISOTHERMAL TRANSFORMATION DIAGRAM OF 20Ni7CrMo2

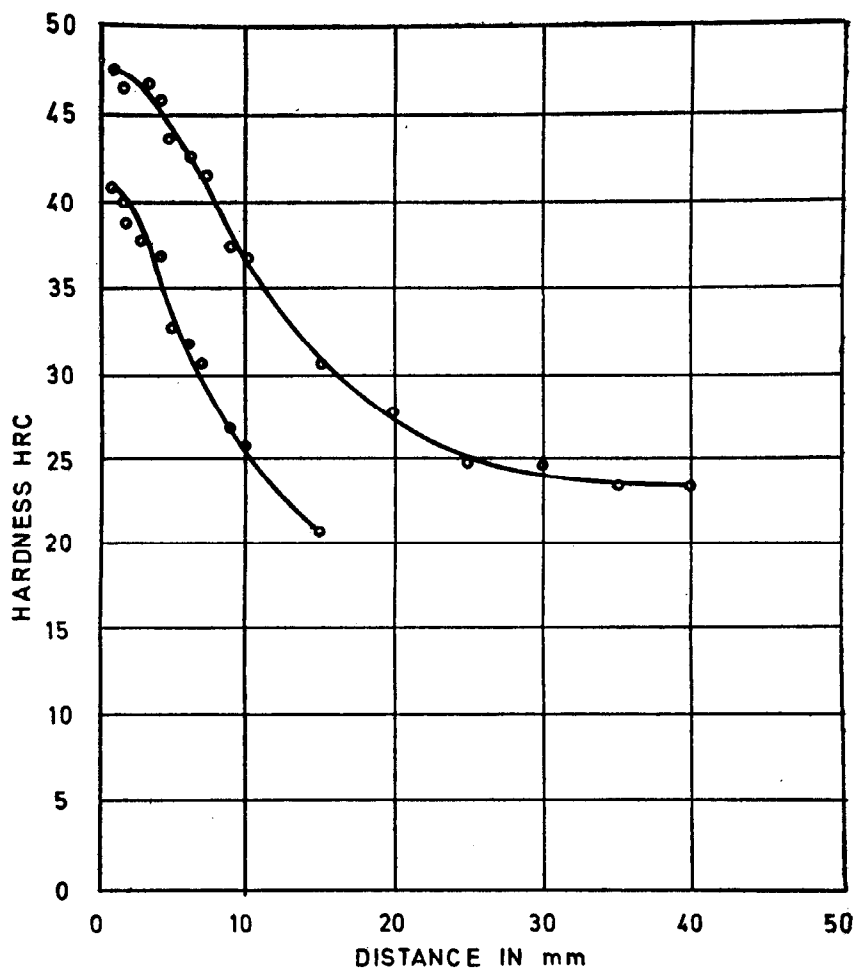


FIG. 2 END QUENCH HARDENABILITY BAND OF
20Ni7CrMo2 GRADE STEEL

(Continued from page 2)

Panel to Collect Data on Steel for Automobile Purpose, SMDC 31 : P-12

Convener

DR R. V. PATHY (Alternate to Mahindra Ugine Steel Co Ltd, Khopoli
Shri R. Narayanan)

Representing

Members

SHRI B. K. ANANTHARAMAII	WG Forge and Allied Industries Ltd, Thane
SHRI O. B. DIAS (Alternate)	
PROF R. C. CHATURVEDI	Indian Institute of Technology, Bombay
SHRI B. HARIDASACHAR	Visvesvaraya Iron and Steel Ltd, Bhadravati
SHRI D. P. VERNEKAR (Alternate)	
SHRI H. A. JAISINGHANI	Mahindra and Mahindra Ltd, Bombay
SHRI M. G. LAWATE	Tata Engineering & Locomotive Co Ltd, Pune
DR V. RAMASWAMY	Steel Authority of India Ltd (Research and Development Centre for Iron and Steel), Ranchi
SHRI S. R. MEDIRATTA (Alternate)	
REPRESENTATIVE	Automobile Products of India Ltd, Bombay
DR K. R. SATYANARAYANAN	College of Engineers, Pune
DR R. D. CHAUDHARI (Alternate)	

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>	<i>Definition</i>
Force	newton	N	$1 \text{ N} = 1 \text{ kg.m/s}^2$
Energy	joule	J	$1 \text{ J} = 1 \text{ N.m}$
Power	watt	W	$1 \text{ W} = 1 \text{ J/s}$
Flux	weber	Wb	$1 \text{ Wb} = 1 \text{ V.s}$
Flux density	tesla	T	$1 \text{ T} = 1 \text{ Wb/m}^2$
Frequency	hertz	Hz	$1 \text{ Hz} = 1 \text{ c/s(s}^{-1}\text{)}$
Electric conductance	siemens	S	$1 \text{ S} = 1 \text{ A/V}$
Electromotive force	volt	V	$1 \text{ V} = 1 \text{ W/A}$
Pressure, stress	pascal	Pa	$1 \text{ Pa} = 1 \text{ N/m}^2$